IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 7.39 ⁜ Vol. 11, Issue 4, April 2022

DOI: 10.17148/IJARCCE.2022.114201

QR CODE GENERATOR USING PYTHON

Rohit Sahay[1], Mayur Waghela[2], Abhishek Mulgaonkar[3], Vansh Tiwari[4], Lect.A.P.Shinde

[1,2,3,4]Student, Dept. of Computer Technology, B.V.J.N.I.O.T, Pune, Maharashtra, India.

[5]Lecturer, Dept. of Computer Technology, B.V.J.N.I.O.T, Pune, Maharashtra, India.

Abastract: Quick Response (QR) codes seem to appear everywhere these days. We can see them on posters, magazine ads, websites, product packaging and so on. Using the QR codes is one of the most intriguing ways of digitally connecting consumers to the internet via mobile phones since the mobile phones have become a basic necessity thing of everyone. In this paper, we present a methodology for creating QR codes by which the users enter text into a web browser and get the QR code generated. Drupal module was used in conjunction with the popular libqrencode C library to develop user interface on the web browser and encode data in a QR Code symbol. The experiment was conducted using single and multiple lines of text in both English and Thai languages. The result shows that all QR encoding outputs were successfully and correctly generated.

Keywords: QR code, Quick Response Code, Storage Capacity, Online QR Code Generator.

I. INTRODUCTION

QR Code is two-dimensional barcode which is categorized in matrix barcode that can store data information. QR stands for “Quick Response” as the creator intended the code to allow its contents to be decoded at high speed. It is introduced in Japan by Denso Corporation in 1994 [1]. This kind of barcode was initially used for tracking inventory in vehicle parts manufacturing and is now used in a variety of industries. Nowadays, mobile phones with built-in camera are wildly used to recognize the QR code [1-4]. There have been many URL shortening services that automatically generate QR code links to websites such as Goo.gl [5] and Bit.ly [6]. Goo.gl is the first introduced URL shortening service that provides automatically generates QR codes. only 12 days after introducing Goo.gl, Bit.ly launched the same service. The URL shortening service shortens link and turn it into a QR code that, when scanned with a mobile QR code reader, automatically direct users to the shortened link. It really shows that QR codes are going to become more and more popular.

2. QR CODE

QR Code has been approved as an AIM Standard, a JIS Standard and an ISO standard [7]. In 2000 years, QR Code is being issued as National standard in China [8]. The QR code provides 40 specifications and correct grade such as L, M, Q, H. A QR Code can hold a considerably greater volume of information: 7,089 characters for numeric only, 4,296 characters for alphanumeric data, 2,953 bytes of binary (8 bits) and 1,817 characters of Japanese Kanji/Kana symbols. QR Code also has error correction capability. Data can be restored even when substantial parts of the code are distorted or damaged. A. QR Code structure QR Code is comprised of black and white patterns on geometric plane surface in the two dimensions. It uses black pattern to stand for binary number 1, and white pattern to represent binary number 0. The QR code is capable of 360 degree (Omni-directional). There are three finder patterns located at the corners. QR Code contains information in both the vertical and horizontal directions, whereas a bar code contains data in one direction only. QR Code holds a considerably greater volume of information than a bar code as shown in Fig. 1

Fig. 1

3. STEPS TO BUILD THE QR CODE GENERATOR IN PYTHON

To Build QR Code Generatror Project Using Python We Needed To Follow The Below Steps
1. Importing the Modules
2. Creating the main window

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 7.39 ⁜ Vol. 11, Issue 4, April 2022

DOI: 10.17148/IJARCCE.2022.114201

3. Taking the input of the text/URL, location to store the QR code, name of the QR code and the size of the QR code
4. Writing the function to generate and save the QR Code

1. Importing the modules

The first step is to import the qrcode and the tkinter module. We use the messagebox in the tkinter module to show the pop up messages.shown as fig. 2

```
1. import qrcode
2. from tkinter import *
3. from tkinter import messagebox
```

Fig. 2

2. Creating the main window

Next, we create the main window with title, size and color.

```
1. #Creating the window
2. wn = Tk()
3. wn.title('DataFlair QR Code Generator')
4. wn.geometry('700x700')
5. wn.config(bg='SteelBlue3')
```

3. Taking the inputs

Now, we take the inputs from the user to create the QR Code. We take the following inputs:

1. Text/URL as Entry() named as ‘text’

2. Location to save the QR Code as Entry() named as ‘loc’

3. Name of the QR Code image when saved in the device as Entry() named as ‘name’

4. Size of the QR Code to be generated as Entry() named ‘size’. In this the user has to give the size in the range 1-40. 1 being the smallest size of 21×21.

Then we create a button when clicked generates the QR Code and saves it by executing the generateCode() function.

4. Creating the function to generate QR code and save it

Finally, we create the function to generate the code that runs on clicking the button. In this,

1. First we create the QRCode object with the version/size that user gave as input in the size() entry

2. Then we add the text that we need to encode by getting from the entry ‘text’

3. Then we get the QR code and save it in the directory that user gave as input

4. After this, we show the pop up message to confirm the user that the image is saved

As Shown In Fig 3

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 7.39 ⁜ Vol. 11, Issue 4, April 2022

DOI: 10.17148/IJARCCE.2022.114201

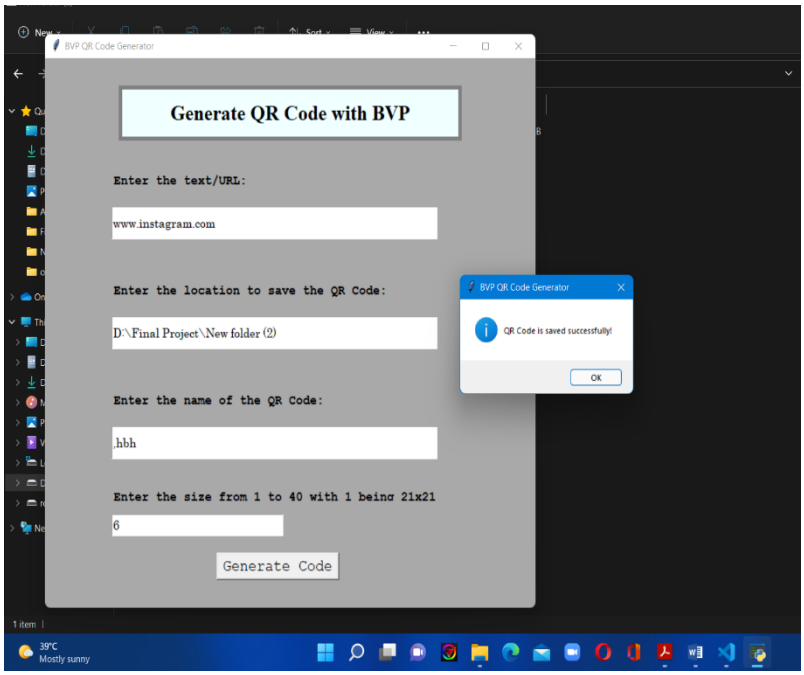

Fig. 3

4. LITERATURE REVIEW

Quick Response code is usually authenticated with the help of the camera of one's mobile phone. QR codes can easily scanned through mediums like Tablets, laptops and personal computer desktops. The system automatically generates the ID of the user and its password. The characteristic which makes QR codes stand out is they can still be scanned even if they are partially damaged. QR codes are a 2 dimensional printing code on a paper or a screen which makes it pretty vulnerable from various type of cyber-attacks. It can harm your device by unknowingly directing you to a virus contaminated page or website. To avoid this, one must verify the origin of a particular QR code and must have a full understanding of the data type of that particular QR code. There are many attacks involving QR codes as well as their solutions. QR codes are becoming quite popular nowadays because of the rapid increase in smart devices by the normal people around the world. Obviously, 2D QR code is way better and store huge amount of encoded information compared to the old traditional 1D codes. People are using smartphones to do authentications and for this the QR codes are the most ideal way to do it. Many types of QR codes are getting popular nowadays including logo QR code, encrypted QR code, iQR Code etc. QR codes are becoming popular day by day in the upcoming generation as it offers way easier authentication that the traditional old fashioned user id and password. QR codes offers many advantages such as greater storage capacity, fast readability, 360 degree reading, small print size, error correction, support for more languages and durability against soil and damage. Many firms who are relatively new in the online business are tend to use these codes instead of normal login process. To fix the QR information / security issue, Xiaohe Cao proposed a safe QR code scheme based on visual cryptography. The security problem of QR code is severe, such as data loss and data tampering as the implementation of QR Code is wide enough. The QR code is spilt into two shared pictures which will be transmitted singly. The development of the two shared pictures is based on the pseudo-random matrix, i.e. the pixels are determined by the pseudo-random matrix values in the two shared pictures. The two images shared can only be stacked to revive the information. Simulation output demonstrates that the picture of the QR code can be masked well and can be efficiently reconditioned. Peter Kieseberg has examined how both automated systems and human interaction can be attacked using QR Codes. As the encoded data is meant to be machine readable only, one cannot differentiate between a legitimate and a harmful corrupted QR code. While automated readers are very much endangered to SQL injections and command injections, individuals might be prone to phishing attacks. Peter Kieseberg contribution is a survey of the QR code as an attack vector, demonstrating different attack plans for the attackers to read and explore the implications.

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 7.39 ⁜ Vol. 11, Issue 4, April 2022

DOI: 10.17148/IJARCCE.2022.114201

5. METHODOLOGY

Scientific research has been playing an important role in the progress and enrichment of new age technology. Research is invention or scientific investigation or scientific enquiry to extract truth or invent new concepts by scientific way. Descriptive research consists of fact-finding enquiries and surveys of various kinds. The main motive of descriptive analysis is explanation of the state of affairs as it currently exists. Research can be either applied to study or to fundamental studies. The objective of applied analysis is to find a solution to an instant issue facing a community or an industrial/business organization, whereas basic study is primarily worried with generalizations and the formulation of a theory. Quantitative research is based on quantity or quantity measurements. It applies to events that can be stated in quantity terms. On the other side, qualitative research is concerned with the phenomenon of quality. Conceptual study involves some theory or abstract ideas. Theorist and thinkers typically use it to develop fresh thoughts or reinterpret current ones. However, inquiry relies on knowledge or examination alone, often without proper scheme and theory consideration. It is data-based study, resulting in judgments that can be checked through observation or experimentation. We did QR Code analysis with the assistance of all these techniques.

6.QR CODE STRUCTURE

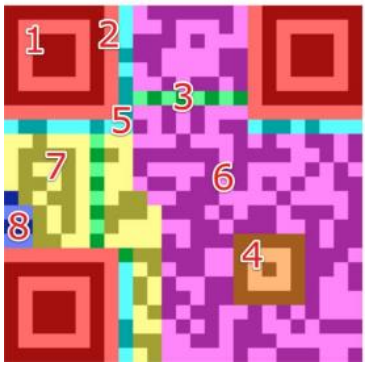

Figure 4. Structure of QR Code

Finder Pattern (1): The finder pattern comprises of three identical structures that are situated in all corners of the QR Code except the bottom right one. Each pattern is based on a black module matrix of 3x3 encircled by white modules that are again surrounded by black modules. The Finder Patterns allows the decoder software to identify the QR Code and determine the exact orientation. Separators (2): The white separators have a width of one pixel and boosts the recognition of the Finder Patterns as they isolate them from the actual data. Timing Pattern (3): In the Timing Pattern, alternating black and white modules allows the decoder software to determine a single module's width. Alignment Patterns (4): Alignment Patterns helps to reimburse the decoder software for mild picture deformation. Version 1 QR codes have no Alignment Patterns. With increased code size, more Alignment Patterns are added. Format Information (5): The Formation Information section is made up of 15 bits next to the separators and stores data about the QR code error correction rate and the masking model selected. Data (6): Data is converted into a bit stream and then stored in information segment in 8 bit sections (known as codewords). Error Correction (7): Similar to the data section, error correction codes are stored in 8 bit long code-words in the error correction section. Remainder Bits (8): This section consists of empty bits, if data and error correction bits cannot be split into 8 bit codewords without remainder. To enhance code recognition by the decoder software, the entire QR code must be encircled by the so called Quiet Zone, an area in the identical color shade as white modules.

6.1 QR CODE ATTACK

Kaspersky Lab diagnosed a first-of-its kind corrupted QR code in September 2011. The attack method applied in the QR code was that once the individual scans the code he is taken to a website which downloads a malicious file within the user's device without the knowledge of the user. Till now, this is the sole technique of attack familiar regarding malicious QR codes. They detected many malignant websites having QR codes for mobile apps (e.g. Jimm and Opera Mini).

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 7.39 ⁜ Vol. 11, Issue 4, April 2022

DOI: 10.17148/IJARCCE.2022.114201

7. RESEARCH FINDINGS

QR codes contain many alternative styles of information. Different app readers on Smartphone are able to act and read this data. Think of it as an alternate means of obtaining information into your phone (as substitute to writing it manually). Here are some of the possibilities:

Calendar event: If there is an event that you would like to promote, you can create a QR code containing info for that event. QR codes containing event information will contain event title, start and end date/time, time zone, location, and description.

Geo location: If you have an event you want to promote, you might want to stick a QR code linking someone to a Google Maps location. This will permit somebody to scan your QR code and obtain directions so that they do not have to manually search for an address.

Wifi network: does one hate telling somebody an extended WEP wireless key that is a pain to input manually on a mobile phone? Set it up therefore somebody will scan a QR code and automatically connect to WiFi on through their smartphones.

URL: the probabilities of encryption web address into barcode square measure endless. You can use a link that takes someone to your Facebook fan page, LinkedIn or Twitter profile. You can link somebody to a YouTube video. Check in to some place via check in link. Encoding Android Playstore or iPhone app store link enables promoting and downloading your mobile application anytime anywhere. Or maybe someone can just pay for product or service via PayPal.

7.1 MERITS OF THE QR CODE

- Omnidirectional and Fast Scanning: QR code can be read much faster and within 360 degrees can be scanned from any angle i.e. no need to place the scanner as per the code symbol.

- Small Size: QR code takes less space. A QR Code can hold the same volume of information contained in a 1-D barcode in only one-tenth the space.

- Huge Data Storage Capacity: QR code has high data storage capacity. A single QR Code token can store up to 7,089 numerals (200 times the volume of information storage capacity of the traditional 1-D barcode).

- Many Types of Data: The QR Code can handle numerals, alphanumeric characters, Japanese, Chinese or Korean letters and binary data.

- Error correction: Error correction technique used in QR codes enables successful decoding of the code symbol even if up to 30% of the data is dirty or damaged.

- Available for Everyone: Anyone can make their own QR code according to their need, for example, user can create QR code of the URL of its own website for advertising purpose.

- Wide Range of Uses: There are lots of potential uses of QR codes. They can be implemented to extend the user experience in store, restaurants, websites and more.

7.2 DEMERITS OF THE QR CODE

Although QR code has many positive points on its side but, there are some demerits of the QR code too, such as, Need of QR code scanner; to decode the code users must have a QR reader app, which limits the audience; Security issues, the scanner never really knows where the code is going to lead the user before scanning a QR code; Lack of public awareness, large portion of population is still unaware of this technology.

8. FUTURE SCOPE

QR codes are becoming one of the most prime facet in cashless transactions. They were already hugely popular and in use in the European countries as well as in America but in past few years, they are gaining momentum in South and East Asia. In China, the implementation of QR code has even surpassed cash and card based transactions. This has to be one of the biggest achievements so far for these QR codes. In India, there is a rapid hike in the usage of QR codes and the new era of cashless India is ushering upon the country's horizon. Many people argue with the fact that QR codes are used

DOI: 10.17148/IJARCCE.2022.114201

as a second fiddle while doing money related transactions. These codes are slowly becoming first preference for many users in the recent times. The main limitation of QR codes is that they are only being used to redirect to a webpage or website but they are not collecting any information on their own. If in this hugely data driven world, if these codes start to collect information and start a two-way transaction then it will surely stabilize in this technology market for future years. Another limitation regarding the application of QR codes is that one must have a QR code reader or scanner installed in their mobile or tablet to be able to scan and read the data held by the QR code. Instead of this, we can create and integrate the QR code scanners in our smartphone's camera itself so that we don't need any other third party application to scan the QR codes. QR codes have been scrutinized by many of the technology and security pundits but still it has been loved and accepted by the normal people at a high context. They have been literally used everywhere as far as promotional events are concerned like mobile payments, coupons, air ticket coupons, business cards, new business profile promotions etc. There are new technologies launching in the last couple of years who are better or more secure than QR codes, but still QR codes will be there for many more years to come because of the ease of their use and many people in the developing countries already adapting them in the recent past. So it is a rare possibility that they will again turn to a new technology after taking so much years to get used to the QR codes.

9. CONCLUSION

In this paper, we have discussed about the analysis of QR codes as well as their applications. The capacity of these codes to store data is very high plus they are damage resistance which makes them overcome one of the key concerns of security. In the past decade or so, the application of QR codes in public domains like supermarkets and in educational purposes like book scanning or stationary scanning has been increased rapidly and it will continue to thrive in more fields as the awareness will increase. The QR code technique is getting popular day by day and at the same time it is becoming increasingly secure as the technology is enhancing. Once, the awareness about these codes increases, it will get a wide spectrum to evaluate its significance. In near future, this technology will be used in wide public domains. Firstly, QR codes were used to store the information about inventory products but nowadays it is being used in the huge industries like marketing, secure payment systems, advertising, education systems etc.

REFERENCES

[1] Priyanka Bhogade, "QR Based Advanced Authentication for Online Transactions", International Journal of Engineering Research & Technology (IJERT), Vol. 3, Issue. 2, February 2014. [2] A. Sankara Narayanan, "QR Codes and Security Solutions", International Journal of Computer Science and Telecommunications, Vol. 3, Issue. 7, July 2012. [3] Peter Kieseberg, Manuel Leithner, Martin Mulazzani, Lindsay Munroe, SebastianSchrittwieser, Mayank Sinha, Edgar Weippl, "QR Code Security", SBA Research, Favoritenstrasse 16, AT-1040 Vienna, Austria. [4] Sumit Tiwari, Dept. of Technical Education SITS Educators Society, Jabalpur, Madhya Pradesh, India, "An Introduction to QR Code Technology", International Conference on Information Technology, 2016. [5] Sangeeta Singh, "QR Code Analysis", International Journal of Advanced Research in Computer Science and Software Engineering, Vol. 6, Issue. 5, May 2016. [6] K. Saranya, R.S.Reminaa, S.Subhitsha, "Modern Applications of QR-Code for Security", 2nd IEEE International Conference on Engineering and Technology (ICETECH), March 2016. [7] Saroj Goyal, Dr. Surendra Yadav, Manish Mathuria, "Concept of QR Code and Its Benefits", 2016 Intl. Conference on Advances in Computing, Communications and Informatics (ICACCI), September 2016. [8] Xiaohe Cao, Liuping Feng, Peng Cao, Jianhua Hu, "Secure QR Code Scheme Based on Visual Cryptography", 2nd International Conference on Artificial Intelligence and Industrial Engineering, 2016.

BIOGRAPHY

Lecturer – Mr. A. P Shinde, Dept. of Computer Technology, B.V.J.N.I.O.T, Pune

IJARCCE ISSN (O) 2278-1021, ISSN (P) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Impact Factor 7.39 ⁜ Vol. 11, Issue 4, April 2022

DOI: 10.17148/IJARCCE.2022.114201

Student- Mr. Rohit Sahay, Dept. of Computer Technology, B.V.J.N.I.O.T, Pune.

Student- Mr. Mayur Waghela, Dept. of Computer Technology, B.V.J.N.I.O.T, Pune.

Student- Mr. Vansh Tiwari, Dept. of Computer Technology, B.V.J.N.I.O.T, Pune.

Student- Mr. Abhishek Mulgaonkar, Dept. of Computer Technology, B.V.J.N.I.O.T, Pune.